

What is claimed is:

- 1 1. An logic unit comprising:
 - 2 a first logic unit connected to a first supply voltage;
 - 3 a second logic unit connected to a second supply voltage; and
 - 4 a voltage-level converter connecting the first logic unit to the second logic unit,
 - 5 the voltage-level converter including at least one transistor having a threshold voltage
 - 6 greater than or about equal to the difference between the second supply voltage and the
 - 7 first supply voltage and the at least one transistor connected to the second supply voltage.
- 1 1^o 2. The logic unit of claim 1, wherein the first logic unit comprises a memory unit.
- 1 3. The logic unit of claim 2, wherein the second logic unit comprises an arithmetic
- 2 unit.
- 1 4. The logic unit of claim 3, wherein the one transistor comprises an insulated-gate
- 2 field-effect transistor.
- 1 5. The logic unit of claim 4, wherein the insulated-gate field-effect transistor
- 2 comprises a *p*-type insulated-gate field-effect transistor.
- 1 6. The logic unit of claim 1, wherein the voltage-level converter comprises an
- 2 inverter.
- 1 7. The logic unit of claim 6, wherein the inverter comprises an *n*-type insulated-gate
- 2 field-effect transistor connected in series with the at least one transistor.
- 1 8. The logic unit of claim 6, wherein the second logic unit comprises a clock
- 2 distribution circuit.

- 1 9. The logic unit of claim 6, where the voltage-level converter comprises a first
- 2 inverter coupled in series to a second inverter.
- 1 10. The logic unit of claim 9, wherein the first inverter includes the at least one
- 2 transistor.
- 1 11. A logic unit comprising:
 - 2 a first logic unit connected to a first supply voltage;
 - 3 a second logic unit connected to a second supply voltage; and
 - 4 a logic circuit connecting the first logic unit to the second logic unit, the logic
 - 5 circuit including at least one transistor having a threshold voltage greater than or about
 - 6 equal to the difference between the second supply voltage and the first supply voltage
 - 7 and the at least one transistor connected to the second supply voltage .
- 1 12. The logic unit of claim 11, wherein the logic circuit comprises an AND circuit.
- 1 13. The logic unit of claim 11, wherein the logic circuit comprises a NAND circuit.
- 1 14. The logic unit of claim 11, wherein the logic circuit comprises an OR circuit.
- 1 15. The logic unit of claim 11, wherein the logic circuit comprises a NOR circuit.
- 1 16. The logic unit of claim 11, wherein the logic circuit comprises an XOR circuit.
- 1 17. The logic unit of claim 11, wherein the second logic unit comprises a clock
- 2 distribution circuit.
- 1 18. The logic unit of claim 17, wherein the logic circuit comprises a NAND circuit.
- 1 19. The logic unit of claim 17, wherein the logic circuit comprises a NOR circuit.

1 20. The logic unit of claim 11, wherein the second logic unit comprises an arithmetic
2 unit.

1 21. The logic unit of claim 20, wherein the logic circuit comprises an OR circuit.

1 22. The logic unit of claim 20, wherein the logic circuit comprises an XOR circuit.

1 23. A method comprising:

2 transmitting a logic signal from a logic unit having an output voltage swing
3 between a first voltage level and a second voltage level, the first voltage being greater
4 than the second voltage level;

5 receiving the logic signal at a logic circuit having a pull-up transistor and an
6 output voltage swing between a third voltage level and a fourth voltage level, the third
7 voltage being greater than the fourth voltage level; and

8 turning off the pull-up transistor when the logic signal has a value slightly greater
9 than the difference between the third voltage level and the first voltage level, the third
10 voltage level being greater than the first voltage level.

1 24. The method of claim 23, further comprising:

2 generating an output logic signal at the logic circuit, the output logic signal having
3 a voltage swing between the third voltage level and the fourth voltage level; and

4 receiving the output logic signal at an inverter having an output voltage swing
5 between the third voltage level and the fourth voltage level.

1 25. The method of claim 23, further comprising:

2 generating an output logic signal at the logic circuit, the output logic signal having
3 a voltage swing between the third voltage level and the fourth voltage level; and

4 receiving the output logic signal at a logic circuit having an output voltage swing
5 between the third voltage level and the fourth voltage level.